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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 09/676,727 | 09/29/2000 | Francis X. Canning | CANNING.001A | 2872 |

20995 7590 05/08/2007
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| EXAMINER | |
|---|---|
| DAY, HERNG DER | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2128 | |

| NOTIFICATION DATE | DELIVERY MODE |
|---|---|
| 05/08/2007 | ELECTRONIC |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/676,727 | CANNING, FRANCIS X. | |
| | Examiner | Art Unit | |
| | Herng-der Day | 2128 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on 26 March 2007.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-22,34-37 and 39-54* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22,34-37 and 39-54* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

**1.** This communication is in response to Applicant's RCE and Amendments and Response ("Amendment") to Office Action dated January 26, 2007, filed March 26, 2007.

**1-1.** Claim 39 has been amended. Claims 1-22, 34-37, and 39-54 are pending.

**1-2.** Claims 1-22, 34-37, and 39-54 have been examined and rejected.

### *Claim Rejections - 35 USC § 112*

**2.** The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

**3.** Claims 39 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

**3-1.** Claim 39 recites the limitation, "wherein said composite sources are similar in functional form to said composite testers" in lines 3-4 of the claim, which is unclear and indefinite regarding the meaning of "similar in functional form". For the purpose of claim examination, the Examiner will interpret "wherein said composite sources are similar in functional form to said composite testers" as "wherein each of the composite sources and composite testers is constructed respectively as a linear combination of its corresponding original sources or original testers".

### *Claim Rejections - 35 USC § 101*

**4.** 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

**5.** Claims 1-22, 34-37, and 39-54 are rejected under 35 U.S.C. 101 because the inventions as disclosed in claims are directed to non-statutory subject matter.

**5-1.** Claims 1-22, 34-37, and 39-54 are directed to the manipulation of abstract ideas of data compression, calculating composite sources and testers, and transforming equations. This claimed subject matter lacks a practical application of a judicial exception (law of nature, abstract idea, naturally occurring article/phenomenon) since it fails to produce a useful, concrete, and tangible result.

As stated in the MPEP 2106 IV, "Likewise, a claim that can be read so broadly as to include statutory and nonstatutory subject matter must be amended to limit the claim to a practical application. In other words, if the specification discloses a practical application of a section 101 judicial exception, but the claim is broader than the disclosure such that it does not require a practical application, then the claim must be rejected." and "The tangible requirement does not necessarily mean that a claim must either be tied to a particular machine or apparatus or must operate to change articles or materials to a different state or thing. However, the tangible requirement does require that the claim must recite more than a 35 U.S.C. 101 judicial exception, in that the process claim must set forth a practical application of that judicial exception to produce a real-world result. Benson, 409 U.S. at 71-72, 175 USPQ at 676-77 (invention ineligible because had "no substantial practical application.")."

Specifically, the claimed subject matter describes nothing more than the manipulation of abstract ideas of data compression, calculating composite sources and testers, and transforming equations, which are basic mathematical constructs. More specifically, the claimed subject matter provides for transforming a system of linear equations to use the composite sources and the composite testers to produce a second system of equations. This produced result remains in the abstract.

**5-2.** The Examiner acknowledges that even though the claims are presently considered non-statutory they are additionally rejected below over the prior art. The Examiner assumes the Applicant will amend the claims to overcome the 101 rejections and thus make the claims statutory.

### *Recommendations*

**6.** Claim 4 recites the limitations "plurality of directions" in line 1 and line 2 of the claim. For clarification purposes, the Examiner suggests that "plurality of directions" be replaced with "plurality of angular directions".

### *Claim Rejections - 35 USC § 102*

**7.** The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**8.** Claims 1-22, 34-37, and 39-54 are rejected under 35 U.S.C. 102(b) as being anticipated by Canning et al., Rockwell Inst. Sci. Center, "Fast Direct Solution of Standard Moment-Method Matrices", IEEE Antennas and Propagation Magazine, June 1998, pages 15-26, hereafter referred to as Rockwell.

**8-1.** Regarding claim 1, Rockwell discloses a method of data compression, comprising:

partitioning a first set of basis functions into groups, each group corresponding to a region, each basis function corresponding to one unknown in a system of linear equations, each of said basis functions corresponding to an original source (basis functions, page 16, left column, paragraph 2);

selecting a plurality of spherical angles (angle, page 15, right column, the last paragraph);

using a computer system, calculating a far-field disturbance produced by each of said basis functions in a first group for each of said spherical angles to produce a matrix of transmitted disturbances (matrix A, page 15, right column, the last paragraph);

reducing a rank of said matrix of transmitted disturbances to yield a second set of basis functions, said second set of basis functions corresponding to composite sources, each of said composite sources comprising a linear combination of a number N of said original basis functions (singular value decomposition. ... Lanczos Bi-diagonalization. ... as a linear combination of the original m (n) source (testing) functions for block A, page 16, left column, paragraph 2);

partitioning a first set of weighting functions into groups, each group corresponding to one of said regions, each weighting function corresponding to a condition, each of said weighting

functions corresponding to an original tester (testing functions, page 16, left column, paragraph 2);

using a computer system, calculating a far-field disturbance received by each of said testers in a first group for each of said spherical angles to produce a matrix of received disturbances (matrix A (a matrix that is different from the matrix A of transmitted disturbances), page 15, right column, the last paragraph);

reducing a rank of said matrix of received disturbances to yield a second set of weighting functions, said second set of weighting functions corresponding to composite testers, each of said composite testers comprising a linear combination of a number M of said original testers, wherein at least one of either M or N is greater than one (singular value decomposition. ... Lanczos Bi-diagonalization. ... as a linear combination of the original m (n) source (testing) functions for block A, page 16, left column, paragraph 2); and

transforming said system of linear equations to use said composite sources and said composite testers to produce a second system of equations wherein at least a portion of said second system of equations is compressed relative to said system of linear equations and wherein for at least a first portion of said second system of equations, said first portion using said composite sources and said composite testers, at least a portion of said matrix of transmitted disturbances is different from said matrix of received disturbances (a fast sparse solution, page 16, left column, the last paragraph).

**8-2.** Regarding claim 2, Rockwell discloses a method of data compression, comprising:

partitioning a first set of basis functions into groups, each group corresponding to a region, each basis function corresponding to an unknown in a system of equations, each of said

basis functions corresponding to an original source (basis functions, page 16, left column, paragraph 2);

selecting a first plurality of angular directions (angle, page 15, right column, the last paragraph);

using a computer system, calculating a disturbance produced by each of said basis functions in a first group for each of said angular directions to produce a matrix of disturbances (matrix A, page 15, right column, the last paragraph);

using said matrix of disturbances to compute a second set of basis functions, said second set of basis functions corresponding to composite sources, wherein at least one of said composite sources is configured to produce a relatively weak disturbance from a portion of space around said at least one composite source (singular value decomposition. ... Lanczos Bi-diagonalization, page 16, left column, paragraph 2);

partitioning a first set of weighting functions into groups, each group corresponding one of said regions, each weighting function corresponding to a condition, each of said weighting functions corresponding to an original tester (testing functions, page 16, left column, paragraph 2);

using a computer system, calculating a disturbance received by each of said testers in a second plurality of angular directions to produce a matrix of received disturbances (matrix A (a matrix that is different from the matrix A of transmitted disturbances), page 15, right column, the last paragraph);

using said matrix of received disturbances to compute a second set of weighting functions, said second set of weighting functions corresponding to composite testers, wherein at

least one of said composite testers is configured to weakly receive disturbances from a portion of space relative to said at least one composite tester (singular value decomposition. ... Lanczos Bi-diagonalization, page 16, left column, paragraph 2); and

transforming at least a first portion of said system of equations into a transformed system of equations to use one or more of said composite sources and one or more of said composite testers wherein at least a second portion of said transformed system of equations is compressed relative to said system of equations (a fast sparse solution, page 16, left column, the last paragraph).

**8-3.** Regarding claim 3, Rockwell further discloses said matrix of disturbances is a moment method matrix (MoM matrix, page 16, left column, paragraph 4).

**8-4.** Regarding claim 4, Rockwell further discloses said step of using said matrix of disturbances to compute a second set of basis functions comprises reducing a rank of said matrix of disturbances (In Section 4, these low-rank approximations are computed, page 16, left column, the last paragraph).

**8-5.** Regarding claim 5, Rockwell further discloses said step of using said matrix of received disturbances to compute a second set of weighting functions comprises reducing a rank of said matrix of received disturbances (In Section 4, these low-rank approximations are computed, page 16, left column, the last paragraph).

**8-6.** Regarding claim 6, Rockwell further discloses said disturbance is at least one of an electromagnetic field, a heat flux, an electric field, a magnetic field, a vector potential, a pressure, a sound wave, a particle flux, a weak nuclear force, a strong nuclear force, and a gravity force (electromagnetic interference, page 15, left column, the last paragraph).

**8-7.** Regarding claim 7, Rockwell further discloses said first plurality of directions is substantially the same as said second plurality of directions (angle, page 15, right column, the last paragraph).

**8-8.** Regarding claim 8, Rockwell further discloses said regions of space around said at least one composite source are far-field regions (these regions are not physically close to each other at any point, page 15, right column, the last second paragraph).

**8-9.** Regarding claim 9, Rockwell further discloses said at least a portion of a region around said at least one composite tester is a far-field region (these regions are not physically close to each other at any point, page 15, right column, the last second paragraph).

**8-10.** Regarding claim 10, Rockwell discloses a method of data compression, comprising:

calculating one composite source as a linear combination of more than one basis function, wherein at least one of said composite sources is configured to produce a relatively weak disturbance in a portion of space related to said at least one composite source (basis functions, … singular value decomposition. … Lanczos Bi-diagonalization. … as a linear combination of the original m (n) source (testing) functions for block A, page 16, left column, paragraph 2);

using a computer system, calculating one composite tester as a linear combination of more than one weighting function, wherein at least one of said composite testers is configured to be relatively weakly affected by disturbances propagating from a portion of space around said at least one composite tester (testing functions, … singular value decomposition. … Lanczos Bi-diagonalization. … as a linear combination of the original m (n) source (testing) functions for block A, page 16, left column, paragraph 2); and

transforming at least a portion of a first system of equations based on said basis functions and said weighting functions into a second system of equations based on said composite sources and said composite testers, wherein for an element of said second equations one of said one or more composite sources and one of said one or more composite testers are computed using at least partially different data, and wherein said second equations are compressed relative to said first system of equations (a fast sparse solution, page 16, left column, the last paragraph).

**8-11.** Regarding claim 11, Rockwell further discloses said disturbance is at least one of, an electromagnetic field, a heat flux, an electric field, a magnetic field, vector potential, a pressure, a sound wave, a particle flux, a weak nuclear force, strong nuclear force, and a gravity force (electromagnetic interference, page 15, left column, the last paragraph).

**8-12.** Regarding claims 12-16, Rockwell further discloses a technique applies not only to antenna and propagation problem, but also to all electromagnetic problems. It can be applied to matrices coming from nearly all integral-equation formulations and other linear wave phenomena (page 15, left column, the last paragraph through right column, paragraph 1).

**8-13.** Regarding claim 17, Rockwell further discloses each of said composite sources corresponds to a region (region, page 15, right column, the last second paragraph).

**8-14.** Regarding claim 18, Rockwell further discloses said second system of equations is described by a sparse block diagonal matrix (sparse representation, page 16, left column, paragraph 4).

**8-15.** Regarding claim 19, Rockwell further discloses comprising the step of reordering said sparse block diagonal matrix to shift relatively larger entries in said matrix towards a desired

corner of said matrix (to arrange the singular values in decreasing order, page 17, left column, paragraph 1).

**8-16.** Regarding claim 20, Rockwell further discloses comprising the step of solving said second system of equations (a fast sparse solution, page 16, left column, the last paragraph).

**8-17.** Regarding claim 21, Rockwell further discloses comprising the step of solving said second system of equations to produce a first solution vector, said first solution vector expressed in terms of said composite testers (vector, page 18, left column, paragraph 1).

**8-18.** Regarding claim 22, Rockwell further discloses comprising the step of transforming said first solution vector into a second solution vector, said second solution vector expressed in terms of said weighting functions (orthogonalized version, page 18, left column, paragraph 2).

**8-19.** Regarding claim 34, Rockwell further discloses said transforming said system of linear equations produces a substantially sparse system of linear equations (sparse representation, page 16, left column, paragraph 4).

**8-20.** Regarding claim 35, Rockwell further discloses N is greater than one and M is greater than one (SVD is used to calculate the low-rank approximation to block A and from equation (3) at page 16 and equation (4) at page 17, each row or column of matrix D is a linear combination of corresponding rows or columns of matrix A).

**8-21.** Regarding claim 36, Rockwell further discloses said transforming said system of linear equations produces a substantially sparse system of linear equations (a sparse representation of Z, page 16, left column, paragraph 4).

**8-22.** Regarding claim 37, Rockwell further discloses said matrix of transmitted disturbances is substantially different from said matrix of received disturbances (many fewer than m degree of

freedom are needed to described this interaction. Of course, to a different observation region, different degree of freedom will be necessary, page 15, right column, the last paragraph).

**8-23.** Regarding claim 39, Rockwell further discloses wherein said matrix of transmitted disturbances is a rectangular matrix having a different number of rows and columns, and wherein said composite sources are similar in functional form to said composite testers (The matrix A will be n by m, page 15, right column, the last paragraph; a linear combination of the original m (n) source (testing) functions for block A, page 16, left column, paragraph 2).

**8-24.** Regarding claim 40, Rockwell further discloses said matrix of received disturbances comprises a moment-method matrix (MoM matrix, page 16, left column, paragraph 3).

**8-25.** Regarding claim 41, Rockwell further discloses said matrix of transmitted disturbances comprises a moment-method matrix (MoM matrix, page 16, left column, paragraph 3).

**8-26.** Regarding claim 42, Rockwell further discloses said matrix of received disturbances comprises a moment-method matrix (MoM matrix, page 16, left column, paragraph 3).

**8-27.** Regarding claim 43, Rockwell further discloses said transforming at least a portion of said system of equations to use one or more of said composite sources and one or more of said composite testers comprises transforming substantially all of said system of equations to use one or more of said composite sources and one or more of said composite testers (a fast sparse solution, page 16, left column, the last paragraph).

**8-28.** Regarding claim 44, Rockwell further discloses said transforming substantially all of said system of equations produces substantial sparseness (a sparse representation of Z, page 16, left column, paragraph 4).

**8-29.** Regarding claim 45, Rockwell further discloses said relatively weak disturbance from a portion of space around said at least one composite source comprises a relatively weak disturbance from a far-field portion of space (the radiated field decays quickly for angles passing through successive sidelobes, page 18, right column, paragraph 1).

**8-30.** Regarding claim 46, Rockwell further discloses said relatively weak disturbance from a portion of space around said at least one composite source comprises a portion of space at distances relatively shorter than a distance to other physical regions (the radiated field decays quickly for angles passing through successive sidelobes, page 18, right column, paragraph 1).

**8-31.** Regarding claim 47, Rockwell further discloses said portion of space at distances relatively shorter than a distance to other physical regions comprises a relatively non-intertwining portion of space (many fewer than m degree of freedom are needed to described this interaction. Of course, to a different observation region, different degree of freedom will be necessary, page 15, right column, the last paragraph).

**8-32.** Regarding claim 48, Rockwell further discloses said relatively weak disturbance from a portion of space around said at least one composite source comprises a portion of space comprising substantially all angular directions in said first plurality of angular directions (m sources are used to describe radiation in all directions and for all distances, page 15, right column, the last paragraph).

**8-33.** Regarding claim 49, Rockwell further discloses said portion of space comprising substantially all angular directions in said first plurality of angular directions comprises a relatively non-intertwining portion of space (many fewer than m degree of freedom are needed to

described this interaction. Of course, to a different observation region, different degree of freedom will be necessary, page 15, right column, the last paragraph).

**8-34.** Regarding claim 50, Rockwell further discloses said transforming at least a portion of a first system of equations comprises transforming substantially all of a first system of equations based on said basis functions and said weighting functions into a second system of equations based on said composite sources and said composite testers (the SVD of A … allows a sparse description of the matrix Z, page 16, left column, the last paragraph).

**8-35.** Regarding claim 51, Rockwell further discloses said second system of equations is substantially sparse (if p<<n, this is a sparse representation of A, page 17, left column, paragraph 3).

**8-36.** Regarding claim 52, Rockwell further discloses wherein said at least a portion of a first system of equations comprises an interaction between at least one of said basis functions is relatively close to and at least one of said weighting functions (the interaction of these two regions will be described by a rectangular piece of Z, page 15, right column, paragraph 4).

**8-37.** Regarding claim 53, Rockwell further discloses wherein either said one or more composite sources is calculated using a matrix of transmitted disturbances or said one or more composite testers is calculated using a matrix of received disturbances (singular value decomposition. … Lanczos Bi-diagonalization. … as a linear combination of the original m (n) source (testing) functions for block A, page 16, left column, paragraph 2).

**8-38.** Regarding claim 54, Rockwell further discloses wherein either said one or more composite sources is calculated using a matrix of transmitted disturbances or said one or more composite testers is calculated using a matrix of received disturbances (singular value

decomposition. ... Lanczos Bi-diagonalization. ... as a linear combination of the original m (n) source (testing) functions for block A, page 16, left column, paragraph 2).

*Applicant's Arguments*

**9.** Applicant argues the following:

**9-1.** Response to Rejection of Claim 39 Under 35 U.S.C. 112, Second paragraph

(1) "Claim 39 has been amended to more particularly point out and distinctly claims the subject matter Applicant regards as the invention." (page 10, paragraph 3, Amendment).

**9-2.** Response to Rejection of Claims 1-22, 34-37 and 39-54 Under 35 U.S.C. 101

(2) "Applicant argues that the data compression produced by the claimed method provides a practical application, namely, a reduction in computer storage and/or memory requirements. This practical application is useful when used in conjunction with computing and/or with a computing system." (page 10, paragraph 5, Amendment).

**9-3.** Response to Rejection of Claims 1-21, 34-37 and 40-54 Under 35 U.S.C. 102(b)

(3) "Apparently in response, the Examiner made the statement discussed above which implied that since both Rockwell and the current invention may use a rank reduction they must be the same method. Thus, the rejection does not appear to consider the distinction argued by Applicant." (page 12, paragraph 4, Amendment).

(4) "Applicant argues that there is a difference in the data used in finding a composite source and in finding a composite tester and that this is a distinguishing feature from Rockwell." (page 14, paragraph 1, Amendment).

(5) "The present application teaches how to produce results other than those of Rockwell. For example, in the case of the one by three matrix A discussed above, reducing a rank using an SVD or using other methods can produce three or more non trivial vectors, any of which can be used." (page 14, paragraph 4, Amendment).

(6) "Rather, in 9-4, Examiner argued that both Rockwell and the current invention make use of the same or similar mathematical methods. However, the rejection does not take into consideration the fact that these methods are applied in a different manner. The rejection does not appear to show consideration of the example presented by Applicant to distinguish Rockwell. In the example, Applicant describes three vectors produced by the claimed invention where the invention of Rockwell could produce only one." (page 15, paragraph 1, Amendment).

(7) "The Final Office Action mailed January 26, 2007 does not appear to respond to this argument." (page 15, the last second paragraph, Amendment).

(8) "In view of the arguments and distinctions provided by Applicant, Applicant does not understand the basis for the rejection of Claims 1-22, 34-37, and 39-54." (page 15, the last paragraph, Amendment).

***Response to Arguments***

**10.** Applicant's arguments have been fully considered.

**10-1.** Applicant's argument (1) is not persuasive. Claim 39 is currently rejected under 35 U.S.C. 112, second paragraph, as detailed in section **3-1** above because the meaning of "similar in functional form" is unclear and indefinite.

**10-2.** Applicant's argument (2) is not persuasive. Claims 1-22, 34-37, and 39-54 are currently rejected under 35 U.S.C. 101 as detailed in section **5-1** above because the claimed subject matter lacks a practical application to produce a useful, concrete, and tangible result.

**10-3.** Applicant's arguments (3) and (5)-(7) are not persuasive. Applicant disclosed in the specification at page 15, lines 3-16, "Each composite source is typically a linear combination of one or more of the original sources. A matrix method is used to find composite sources that broadcast strongly and to find composite sources that broadcast weakly. These composite sources are constructed from the original sources. The matrix method used to find composite sources can be a rank-revealing factorization such as singular value decomposition. For a singular value decomposition, the unitary transformation associated with the sources gives the composite sources as a linear combination of sources. Variations of the above are possible. For example, one can apply the singular value decomposition to the transpose of the *s* matrix. One can employ a Lanczos Bi-diagonalization, or related matrix methods, rather than a singular value decomposition. There are other known methods for computing a low rank approximation to a matrix. Some examples of the use of Lanczos Bidiagonalization are given in Francis Canning and Kevin Rogovin, "Fast Direct Solution of Standard Moment-Method Matrices," IEEE AP Magazine, Vol. 40, No. 3, June 1998, pp. 15-26." and at page 16, lines 15-19, "A matrix method is used to construct composite testers that receive strongly and testers that receive weakly. The matrix method can be a rank-revealing factorization such as singular value decomposition. A singular value decomposition gives the composite testers as a linear combination of the testers which had been used in the original matrix description." Accordingly, Applicant admitted the matrix method used to find composite sources and composite testers can be a rank-revealing

factorization such as singular value decomposition and specifically referred to Rockwell's Lanczos Bi-diagonalization method. In other words, applying Rockwell's teaching as well as other known methods for computing a low rank approximation to a matrix in order to use Applicant's invention is well known to one of ordinary skilled in the art or at least is suggested by the Applicant. Because applying Rockwell's singular value decomposition method and Lanczos Bi-diagonalization method is suggested by the Applicant to find composite sources and composite testers all the distinctions argued by the Applicant in applying SVD are anticipated by Rockwell reference either explicitly disclosed or implicitly inherent.

**10-4.** Applicant's arguments (4) and (8) are not persuasive. Although both referenced as Rockwell's matrix A in the Office Action, the Examiner considers there are two different rectangular matrices representing the matrix of transmitted disturbances and the matrix of received disturbances respectively. Furthermore, Rockwell's singular value decomposition method or Lanczos Bi-diagonalization method is also applied to the different matrix A respectively. Therefore, the data used in finding a composite source and in finding a composite tester is different.

***Conclusion***

**11.** Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Herng-der Day whose telephone number is (571) 272-3777. The Examiner can normally be reached on 9:00 - 17:30.

Any inquiry of a general nature or relating to the status of this application should be directed to the TC 2100 Group receptionist: (571) 272-2100.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Kamini S. Shah can be reached on (571) 272-2279. The fax phone numbers for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Herng-der Day
April 27, 2007 H.D.

SPE AU 2128